

DISCRETE MATHEMATICS
SEMINAR

Joints and Hypergraph Joints

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Abstract: A joint in \mathbb{R}^3 is a common intersection of 3 lines with linearly independent directions. Using the polynomial method, Guth and Katz showed that the number of joints of n lines is $O(n^{3/2})$. We showed a tight bound on this problem, which translates to the Lovász's version of the Kruskal—Katona theorem when restricting to certain configurations.

The Kruskal—Katona theorem finds the maximum number of triangles in an n -edge graph. A generalization of this theorem by Friedgut and Kahn finds the order of the maximum number of any fixed hypergraph H in an n -edge hypergraph. We combined the Friedgut—Kahn theorem and joints and gave a common generalization of them.

This is a JOINT work with Hung-Hsun Hans Yu.

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